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Regulatory Studies Program

Public Interest Comment on
Broadband Industry Practices[1]
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The Regulatory Studies Program (RSP) of the Mercatus Center at George Mason University is dedicated to advancing knowledge of the impact of regulation on society. As part of its mission, RSP conducts careful and independent analyses employing contemporary economic scholarship to assess rulemaking proposals from the perspective of the public interest. Thus, this comment on the Federal Communications Commission's (FCC's) Notice of Inquiry on broadband industry practices does not represent the views of any particular affected party or special interest group, but is designed to evaluate the effect of the Commission's proposals on overall consumer welfare and other public interest values.

I. INTRODUCTION

The FCC should be commended for its effort in this Notice of Inquiry proceeding to better inform itself about broadband industry practices and whether there is a need for "net neutrality" regulations.[2] It is difficult to determine exactly what "net neutrality" means. To many, "net neutrality" appears to mean that Internet service providers may not "provide or sell to Internet content, application or service providers . . . any service that privileges, degrades, or prioritizes any packet transmitted" over the provider's facilities "based on its source, ownership, or destination."[3] This is the "net neutrality" commitment AT&T made as a condition for FCC approval of its merger with BellSouth. Some would

[1] Prepared by Jerry Brito, senior research fellow, and Jerry Ellig, senior research fellow, Mercatus Center at George Mason University. This comment is one in a series of Public Interest Comments from Mercatus Center's Regulatory Studies Program and does not represent an official position of George Mason University.

[2] FCC, NOTICE OF INQUIRY, *In the Matter of Broadband Industry Practices*, WC Docket No. 07-72 (released April 16, 2007), available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-07-31A1.pdf [hereinafter Broadband NOI].

[3] Robert W. Quinn, Jr., Notice of Ex Parte Communication, *In the Matter of Review of AT&T Inc. and BellSouth Corp. Application for Consent to Transfer of Control*, WC Docket No. 06-74 (Dec. 28, 2006) at 8, available at http://www.fcc.gov/ATT_FINALMergerCommitments12-28.pdf.

add an additional provision from the FCC's 2005 Internet Policy Statement: consumers have the right to attach to the network any legal device that does not harm the network.[4]

Proponents argue that, in the absence of such requirements, broadband providers could diminish consumer welfare by exploiting market power, diminish privacy by inspecting packets, and diminish the free flow of communication over the Internet by censoring or imposing prices on certain types of speech. Opponents argue that Internet access providers must have the option to treat some traffic differently in order to manage the network, prevent specific users from using most of the transmission capacity, ensure high-quality service for quality-sensitive applications, and charge prices that allow them to earn a return on their investment in the network.

The Commission takes this opportunity to ask specific, technical questions about network operations and management, as well as pricing and competition practices. A factual record on this front is vital to determining whether regulation is necessary, and if so, what form it should take. Just as vital, however, are the questions the Commission poses about its authority and the process it should engage in if it were to decide to promulgate rules in this area. These are the questions we attempt to answer in this public interest comment.

Specifically, the FCC asks whether it has the authority to enforce its Internet Policy Statement, as it presently exists, to address a specific case or particular market failure it might identify. We suggest that the Internet Policy Statement has no legal force, and legally binding rules would have to be adopted via a notice and comment process if the principles contained in the policy statement are to be made enforceable. Second, the FCC asks how, if it decided to promulgate such rules, it could do so in a manner that would reach only identified market failures or specific problem cases. We suggest a framework for analysis that should guide the Commission in determining whether rules are necessary and, if so, how they should be promulgated. The steps to this framework include defining specific outcomes that broadband policies are supposed to produce, assessing evidence of market failure, identifying the uniquely federal role, comparing the effectiveness of alternative policies, examining the costs of alternative policies, and comparing costs with outcomes.

II. AUTHORITY TO ENFORCE THE INTERNET POLICY STATEMENT

The Commission asks whether it has "the legal authority to enforce the Policy Statement in the face of particular market failures or other specific problems[.]"[5] The short answer is no, the Commission cannot enforce the Policy Statement because it is not a legally

[4] FCC, POLICY STATEMENT, *In the Matters of Appropriate Framework for Broadband Access to the Internet over Wireline Facilities (et. al.)*, CC Docket No. 02-33 (Released Sept. 23, 2005), at 3, available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-05-151A1.pdf [hereinafter Internet Policy Statement]. On February 20, 2007, Skype filed a petition asking the FCC to "ensure that consumers have the right to run the applications of their choosing and attach all non-harmful devices to the wireless network." See *In the Matter of Skype Communications S.A.R.L., Petition to Confirm a Consumer's Right to Use Internet Communications Software and Attach Devices to Wireless Networks* (February 20, 2007).

[5] Broadband NOI at ¶ 11.

binding legislative or interpretative rule. The Commission should nevertheless be commended for asking this question so explicitly because it shows it is seeking to avoid a trap into which many regulatory bodies fall, namely issuing statements that are not legally binding but nevertheless have a practically binding effect because the public is led to believe noncompliance will have negative consequences.[6]

Administrative rulemaking is governed by the Administrative Procedure Act, which requires agencies to observe a legislative process (known as notice and comment) before a legally enforceable rule can be promulgated.[7] As the D.C. Circuit in ***Batterton v. Marshall*** put it, the purpose of requiring notice and comment is "to reintroduce public participation and fairness to affected parties after governmental authority has been delegated to unrepresentative agencies."[8] The court quotes the legislative history of the APA, stating that because of the unrepresentative nature of a regulatory agency, "public participation . . . in the rulemaking process is essential in order to permit administrative agencies to inform themselves, and to afford safeguards to private interests."[9]

The APA defines a rule as "an agency statement of general or particular applicability and future effect designed to implement, interpret, or prescribe law or policy or describing the organization, procedure, or practice requirements of an agency[.]"[10] It further states that rule making is the "agency process for formulating, amending, or repealing a rule[.]"[11] Section 553 of the APA lays out the requirements for agency rule making, including the requirement that "notice of proposed rule making shall be published in the Federal Register,"[12] and "giv[ing] interested persons an opportunity to participate in the rule making through submission of written data, views, or arguments[.]"[13] This is what is known as "notice-and-comment" rulemaking, and rules promulgated as a result of a notice-and-comment process are legally binding and known as legislative rules.

Section 553, however, goes on to state that the notice-and-comment requirement does not apply "to interpretative rules, general statements of policy, or rules of agency organization, procedure, or practice[.]"[14] Interpretative rules clarify or restate existing law or rules and therefore carry the force of law.[15] Because they do not create any new law, but simply restate or clarify existing law without changing its substance, notice and

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[6] Robert A. Anthony, *Interpretive Rules, Policy Statements, Guidances, Manuals, and the Like—Should Federal Agencies Use Them to Bind the Public?*, 41 DUKE L.J. 1311, 1328 (1992).

[7] 5 U.S.C. § 553 (2007).

[8] Batterton v. Marshall, 648 F.2d 694, 703 (D.C.Cir.1980).

[9] *Id*. quoting U.S. Senate Report on the federal Administrative Procedure Act of 1946, S. Doc. No. 248, 79th Cong., 2d Sess. 19-20 (1946).

[10] 5 U.S.C. § 551(4) (2007).

[11] 5 U.S.C. § 551(5) (2007).

[12] 5 U.S.C. § 553(b) (2007).

[13] 5 U.S.C. § 553(c) (2007).

[14] 5 U.S.C. § 553(b)(3)(A) (2007).

[15] Anthony, ***supra*** note 6 at n.59 and accompanying text.

comment is not necessary.[16] On the other hand, statements of policy, which also do not require notice or comment, do not carry the force of law, and are merely "designed to inform rather than to control."[17] They do not carry the force of law because they neither interpret or restate an existing law or legislative rule, nor offer the notice and opportunity for comment necessary under the APA to produce a legally binding legislative rule.

An agency may issue, with or without notice and comment, statements on substantive matters that it has not previously addressed. However, such a "policy statement" will not have the force of law unless it observes the notice-and-comment legislative process laid down by Congress in the APA.[18] Possible Commission rules can therefore be divided into three categories: legislative rules, interpretative rules, and policy statements. The first two have the force of law and may be enforced against private parties, while the last one serves only as an informational statement of Commission intent.

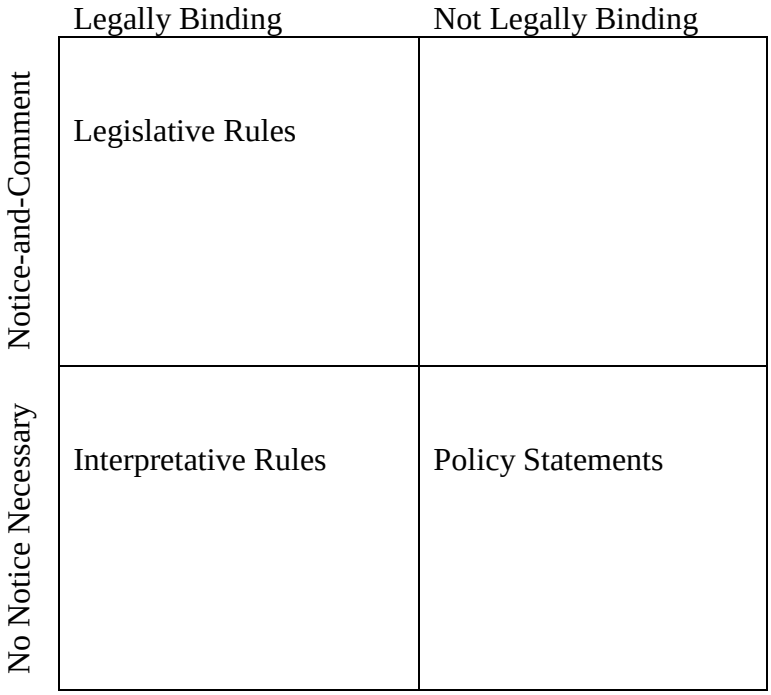

Figure 1 - Types of agency action

[16] *Id.*

[17] American Trucking Ass'ns v. ICC, 659 F.2d 452, 462 (5th Cir. 1981) ("The delegation of power to administrative agencies is essential to the implementation of legislative policy in a complex society. Yet Congress knew that governors must themselves be governed and regulators regulated. Congress therefore required an administrative agency to follow specific procedures in adopting regulatory rules. It exempted from these procedures, however, general policy statements designed to inform rather than to control. For this reason, the APA itself draws a distinction between rules and guidelines.")

[18] Anthony, ***supra*** note 6 at n.7 and accompanying text.

Additionally, under the APA, once a legislative rule has been adopted, the agency must publish the rule in the Federal Register before it will take effect.[19] The exceptions to this publication requirement are for "interpretative rules and statements of policy," among others.[20]

In this case, the Commission's August 5, 2005 Internet Policy Statement does not have legal force because it does not qualify as either a legislative or interpretative rule. It is clearly not a legislative rule because it was issued without notice or an opportunity for comment. It was issued in the docket for the "Appropriate Framework for Broadband Access to the Internet over Wireline Facilities,"[21] a rulemaking proceeding that did publish notice and take public comments. However, that proceeding resulted in a legislative rule, apart from the policy statement, which classified DSL broadband as an information service.[22]

In the DSL Order, the Commission specifically notes that while it is concerned about interference with consumer access to Internet services, it did not find sufficient evidence in the record to issue rules on the matter.[23] The Commission goes on to announce the adoption of the separate Internet Policy Statement and describes it as an articulation of principles it values, namely consumer choice and competition.[24] It finally states, "Should we see evidence that providers of telecommunications for Internet access or IP-enabled services are violating these principles, we will not hesitate to take action to address that conduct."[25] It logically follows that the action implied is the adoption of the type of nondiscrimination rules it declined to adopt in the DSL Order.[26]

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[19] 5 U.S.C. § 552(a)(1), 553(b), (d) (2007).

[20] 5 U.S.C. § 553(d) (2007).

[21] See Internet Policy Statement.

[22] FCC, REPORT AND ORDER AND NOTICE OF PROPOSED RULEMAKING, *In the Matter of Appropriate Framework for Broadband Access to the Internet over Wireline Facilities*, CC Docket No. 02-33 (released September 23, 2005).

[23] *Id*. at ¶ 96.

[24] *Id*.

[25] *Id*.

[26] The D.C. Circuit has found policy statements are often precursors to rule makings but do not carry any legal force themselves:

> In *Pacific Gas & Electric Co. v. Federal Power Commission*, this court delineated the distinction between a substantive rule and a policy statement. The court noted that 5 U.S.C. § 553(b)(A) allows an agency to issue a general statement of policy, which differs from a substantive rule in that a policy statement is "neither a rule nor a precedent but is merely an announcement to the public of the policy which the agency hopes to implement in future rulemakings or adjudications." In this sense, a policy statement is "like a press release" in that it "presages an upcoming rulemaking or announces the course which the agency intends to follow in future adjudications."

Panhandle E. Pipe Line Co. v. FERC, 198 F.3d 266, 269 (D.C. Cir. 1999) quoting Pacific Gas & Electric Co. v. Fed. Power Comm'n, 506 F.2d 33 (D.C. Cir. 1974). Additionally, footnote 15 of the Internet Policy Statement itself acknowledges it is not adopting rules. Internet Policy Statement at n.15.

The fact that the Internet Policy Statement was issued separate and apart from the DSL Order on the same day, along with the Commission's statement in the Order, demonstrates that it was not meant to be part of the greater legislative rule, but rather a general statement of principles and intent carrying no legal force. Additionally, while the DSL Order was published in the Federal Register as is required of all legislative rules, the Internet Policy Statement was not.[27]

That said, some might argue that the Internet Policy Statement qualifies as an interpretative rule that carries the force of law. It does not. While interpretative rules are exempted from the legislative requirements of the APA and publication in the Federal Register, the courts have "consistently declined to allow the exceptions itemized in § 553 to swallow the APA's well-intentioned [legislative] directive."[28] An interpretative rule must interpret the language of a statute or a legislative rule that has some clear meaning. This is because the exception would swallow the rule if, for example, the FCC were allowed to issue new binding substantive regulations by simply interpreting the meaning of non-specific terms such as "just and reasonable" or "public interest" without notice and comment. Again, in issuing an interpretative rule, "an agency is merely explicating Congress' desires" and such action is distinct "from those cases in which the agency is adding substantive content of its own."[29]

As a foundation for its findings, the Internet Policy Statement cites Section 230(b) of the Communications Act, which states that it is the policy of the United States "to preserve the vibrant and competitive free market that presently exists for the Internet"[30] and "to promote the continued development of the Internet."[31] It also cites Section 706(a), which charges the Commission with "encourag[ing] the deployment on a reasonable and timely basis of [broadband] to all Americans."[32] The principles outlined in the Internet Policy Statement may well be consistent with this language in the Act, but they are not an enforceable interpretation of the Act. Not only is the statutory language that is conceivably being interpreted here only a statement of policy itself, and not an enforceable positive statement of law, but the principles outlined in the Internet Policy Statement add new substantive requirements that were not contemplated by the drafters of the Act. While the Commission may have the authority under its Title I ancillary

[27] FCC, *Appropriate Framework for Broadband Access to the Internet Over Wireline Facilities*, 70 FED. REG. 60,222 (Oct. 17, 2005).

[28] American Hosp. Ass'n v. Bowen, 834 F.2d 1037, 1044 (C.A.D.C., 1987), citing Alcaraz v. Block, 746 F.2d 593, 612 (D.C.Cir. 11984) ("The exceptions to section 553 will be 'narrowly construed and only reluctantly countenanced'"); Nat'l Ass'n of Home Health Agencies v. Schweiker, 690 F.2d 932, 949 (D.C.Cir.1982), *cert. denied*, 459 U.S. 1205, 103 S.Ct. 1193, 75 L.Ed.2d 438 (1983) (exceptions to the notice and comment provisions of § 553 are to be recognized "only reluctantly," so as not to defeat the "salutary purposes behind the provisions"); see also Am. Fed'n of Government Employees v. Block, 655 F.2d 1153, 1156 (D.C.Cir. 1981); Am. Bus Ass'n v. United States, 627 F.2d 525, 528 (D.C.Cir.1980); New Jersey Department of Environmental Protection v. EPA, 626 F.2d 1038, 1045 (D.C.Cir.1980).

[29] *American Hosp. Ass'n*, 834 F.2d at 1045.

[30] 47 U.S.C. § 230(b)(2) (2007).

[31] 47 U.S.C. § 230(b)(1) (2007).

[32] 47 U.S.C. § 157 (2007).

jurisdiction to mandate specific nondiscrimination rules, it must issue any such regulation subject to the APA's legislative requirement of notice and comment.[33]

III. Framework for Regulatory Analysis

The FCC will no doubt receive a flood of comments offering a blistering array of arguments and counter-arguments for various regulatory proposals. To evaluate the material on the record, we believe the FCC should employ the same framework for regulatory analysis used by most other federal agencies to evaluate market performance and the pros and cons of prospective regulation.

Effective decision making requires two things: knowledge of the consequences of alternative courses of action and value judgments that allow the decision maker to determine which consequences are the most desirable. Regulatory analysis is a tool for understanding causation—what *is* and what *would likely* happen as a result of various policy initiatives. To decide what *should be done*, decision makers must combine the results of regulatory analysis with value judgments that reflect their assessment of what is worth doing.

But just as analysis is not a substitute for judgment, values are not a substitute for understanding reality. Values determine what outcomes decision makers would want to pursue, but values alone do not provide the cause-and-effect analysis necessary to determine how those outcomes can be accomplished most effectively. Without the firm grounding in reality provided by regulatory analysis, decision makers are flying blind.

The framework outlined below is not new; indeed, most of its elements are articulated in Executive Order 12866 and the Office of Management and Budget's Circular A-4, which guides executive agencies' regulatory analyses.[34] Others are implicit in initiatives to improve the management and performance of federal agencies, such as the Government Performance and Results Act and OMB's Program Assessment Rating Tool.[35] Thus, the

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[33] It should be noted that the enforcement of non-discrimination principles in the much-cited Madison River case took place before the Internet Policy Statement was issued. FCC, CONSENT DECREE, *In the Matter of Madison River Communications, LLC and affiliated companies*, File No. EB-05-IH-0110. In that case, a DSL provider was investigated for allegedly blocking VoIP services that competed with its parent company's telephone service. *Id*. The case was never adjudicated and the DSL provider accepted a consent decree that both it and the FCC agreed did not constitute "a factual or legal finding regarding any compliance or noncompliance with the requirements of the Act and the Commission's orders and rules." *Id*. at ¶ 10. The Madison River case, therefore, is not evidence that the FCC has the authority to enforce the Internet Policy Statement or, indeed, the Act. Additionally, the Commission's investigation of Madison River was predicated on Section 201(b) of the Act, which applies to common carriers. *Id*. at ¶ 1. Since the Madison River consent decree, however, the Commission issued its September 2005 DSL Order that classified DSL as an information service to which Title II common carrier regulations no longer apply.

[34] See *Executive Order 12866 of September 30, 1993, as amended by E.O. 13258 of February 26, 2002 and E.O. 13422 of January 18, 2007*, available at http://www.whitehouse.gov/omb/inforeg/eo12866/eo12866_amended_01-2007.pdf, and *Circular A-4, Regulatory Analysis* (Sept. 17, 2003), available at http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf.

[35] For an explanation of the Program Assessment Rating Tool, see www.expectmore.gov.

proposed framework is largely an extrapolation from existing federal policies and procedures.

SIX KEY STEPS IN REGULATORY ANALYSIS

1. **Identify the desired outcomes**
   Figure out what you're trying to do and how you'll know you did it.

2. **Assess evidence of market failure or other systemic problem**
   Figure out whether government needs to do something, and if so, why.

3. **Identify the uniquely federal role**
   Figure out what the federal government needs to do.

4. **Assess effectiveness of alternative approaches**
   Think about different ways to do it and find the one that works best.

5. **Identify costs**
   Figure out what you have to give up to do whatever you're trying to do.

6. **Compare costs with outcomes**
   Weigh pros and cons.

1. Identify the desired outcomes

"If you don't know where you're going, any road will take you there."

—George Harrison

An outcome is the benefit to the public produced, or harm avoided, as a result of a government action. For the purposes of regulatory analysis, an outcome may satisfy the economist's definition of a net social "benefit," or it may simply be some result that policy makers deem worthwhile. In either case, decision makers need to define the outcome they are trying to affect or achieve, outline a theory of causality or "logic model" that shows how the regulatory proposal is likely to achieve the desired outcome(s), and establish measures that indicate ***whether*** and ***how much*** of the outcome is achieved as a result of the regulation.

Decision makers' values determine what outcomes they deem worthwhile. As in many other FCC proceedings, overall consumer welfare—a concept quite rigorously defined in the economics literature[36]—is one key value at stake in the net neutrality debate.

[36] See, e.g., Dennis W. Carleton and Jeffrey M. Perloff, MODERN INDUSTRIAL ORGANIZATION, 2D. ED. (1994) at 102-107.

However, an analysis of net neutrality that addresses the full panoply of concerns raised by major stakeholders involves other important values in addition to consumer welfare. Various parties have voiced concerns about values such as the First Amendment, political participation, privacy, and American economic competitiveness.[37]

Rigorous, disciplined analysis can play an indispensable role in transforming these "values" debates from a shouting match into a more thoughtful consideration of alternatives and tradeoffs. In some cases, the policies advocated by some stakeholders may not, in fact, effectively further the values they espouse; careful analysis can help identify the most effective means. In many cases, measures that promote consumer welfare can also promote values other than consumer welfare, and it would be useful to know when this can be expected to occur. Where tradeoffs between consumer welfare and other values must be made, analysis can still inform the debate by helping participants understand how much of some other value can be achieved and at what cost in terms of forgone consumer welfare.

The outcomes associated with values other than consumer welfare are often less carefully defined. Competitiveness and economic development, for example, may be linked to consumer welfare, in which case the desirable outcome is the level of competitiveness and/or economic development that maximizes long-term consumer welfare. Some stakeholders, however, may feel that the desirable amount of growth and development differs from the amount that is optimal from a consumer welfare perspective; perhaps "more" is always "better." Only a careful definition of desired outcomes will clarify whether competitiveness is meant to be a means of promoting long-term consumer welfare or an alternative value that may require some sacrifice of consumer welfare.

The outcomes associated with the "First Amendment" or "public discourse" values have not been very well-defined either. This makes it difficult to identify what policies will best promote these values. If the desired outcome is that anyone willing to pay the monthly price for Internet access can communicate with others at some minimum speed, then a policy that promotes "neutral" treatment of everyone on the network may be appropriate. But if the desired outcome is to have as many people as possible connected to the Internet so they can speak if they so choose, then a different policy, aimed at reducing the consumer's total cost of Internet access as well as usage, may be most effective, even if it does not mandate "neutrality."

Identifying the most effective approach involves making testable conjectures about the effects of different business practices and government policies on some specific, defined outcome and then examining the facts to find out which conjectures are right. By defining outcomes, identifying causality, and establishing measures, the FCC can help advance the discussion of "public discourse" values from a shouting match to a cogent exploration of cause and effect.

[37] In February 2007, the Federal Trade Commission held a workshop at which many of these views were aired. See transcript and presentations by Harold Feld (First Amendment and political participation), Jeannine Kenney and Ronald Yokubaitis (privacy), and Harold Feld and Scott Wallstein (American economic competitiveness), available at http://www.ftc.gov/opp/workshops/broadband/index.shtml.

2. Assess evidence of market failure

"First, do no harm."

—Hippocratic Oath

Regulatory economists generally accept that government action can enhance consumer welfare in the case of a clear "market failure" that cannot be addressed adequately by other means.[38] Some forms of "market failure" may arise as a result of barriers to entry or other constraints on private parties created by previously-existing policies. While such policy-driven problems are not technically "market" failures, the problems are likely to persist in the absence of some additional government action. The fundamental solution is to correct the original policy.

A theory of market failure, accompanied by evidence that indicates whether the theory is actually true, should guide the analysis of competition and other clearly "economic" issues. If there is no market failure, government action is unlikely to improve consumer welfare.

When outcomes are defined in terms of values other than consumer welfare, responsible analysis should still articulate a systematic economic theory explaining why voluntary market behavior does not achieve the desired outcome. Such a theory should be accompanied by evidence that permits evaluation of whether the theory is actually true.

There are two reasons why regulatory analysis should explicitly identify a market failure or some other systemic problem underlying the need for action. If in fact there is no market failure or other systemic problem, then government action will likely do more harm than good. If there is a market failure or other systemic problem, then government action can more effectively correct the problem if it has been accurately identified and understood.

Market power is the type of market failure most likely to create a need for "net neutrality" regulation. The more vigorous is competition, the less likely it is that new net neutrality regulation can improve consumer welfare. Competition may also make a significant contribution toward the achievement of values other than consumer welfare. Thus, competition analysis will inevitably play a key role in determining the need for new net neutrality regulation. Competition concerns related to net neutrality fall into two categories: vertical business practices and terminating access monopoly.

[38] The term "market failure" is perhaps an unfortunate piece of economics jargon, because to most people the term "market" implies some form of commercial, for-profit business activity. Market failure then presumably refers to any situation in which commercial activity fails to solve a perceived problem. For many economists, however, the term "market" often has a much broader meaning, referring to any type of voluntary interaction in which people mutually coordinate their activities rather than take directions from a higher (governmental) authority. We use the term in this broader sense. A "market failure" occurs when voluntary activity fails to direct resources to the uses that people value most.

a. Vertical business practices

If the Internet access provider treats different packets of information differently, it could either improve or reduce consumer welfare. Blocking packets allows the network operator to block viruses or other security threats, but it also allows the operator to block content that consumers might want to receive. Assigning different priorities to different types of packets could ensure the quality of services that are heavily dependent on transmission quality (such as VoIP or high-definition video), but it could also let the access provider degrade the quality of services that compete with services it might want to sell.[39]

Charging different prices based on a packet's sender or receiver creates the potential for two types of price differences: tiering of service and price discrimination. Tiering occurs when the access provider charges different prices for different speeds or quality of service. Price discrimination occurs when network owners charge different customers different prices based on different users' sensitivity to price. Both tiering and price discrimination let the network owner cover the costs of fixed investments in a way that least discourages people from using the Internet, because low-cost options are available to those who are only willing to pay a low price. On the other hand, if the network owner has market power, price discrimination may simply let the owner extract more revenues from network users who value the service highly, thus generating monopoly profits. This can reduce consumer welfare even if it generates no loss of economic efficiency.

For these issues, a traditional antitrust-style "rule of reason" analysis of restrictive business practices should suffice. First, define the relevant market. Second, determine whether there is significant market power. Third, if there is market power, determine whether the business practice harms consumers. Fourth, if the business practice harms consumers, determine whether it creates any offsetting benefits to consumers, and evaluate the net effect.

A full-scale antitrust analysis is outside the scope of this comment; its feasibility will likely depend on the quality and quantity of information submitted in this proceeding. But we would like to offer several observations that might inform such an analysis.

Product market definition. Definition of the relevant market should not be based on some arbitrary decision about the speed that some observers (even consumer advocates) believe consumers should, or ought to, want or have. Rather, it should depend on actual evidence demonstrating which services consumers are likely to regard as substitutes.

The FCC's definition of high-speed Internet service (200 kbps) has been widely criticized. Nevertheless, for broadband users who essentially just want something somewhat faster than dial-up, the FCC definition may be quite accurate, and all of the

[39] For a more extensive list of pros and cons, see the February 13 FTC workshop presentation by Jon M. Peha, available at http://www.ftc.gov/opp/workshops/broadband/presentations/peha.pdf.

providers offering speeds faster than 200 kbps might be part of the relevant market. Many broadband users, however, could well desire a particular minimum or average speed, such as 500 kbps, 1 mbps, 5 mbps, etc. For those users, some of the slower broadband offerings might not be part of the relevant market. Depending on the evidence, consumers might possibly be segmented into multiple product markets. A full assessment of "non-neutral" business practices would then need to examine whether the practice is likely to arise in each market, and if so, whether it would create net harm for consumers in each market.

Geographic market definition. The FCC's practice of gathering data on the number of providers by zip code has also been widely criticized. A major criticism derives from the observation that if a broadband provider has a customer in a zip code, that does not mean the provider's service is available to all consumers in that zip code. (For example, even in many suburban areas where DSL is available, some homes cannot receive DSL because they are too far from the phone company's switching office.) The implication of this criticism is that the zip code data should be rejected because the relevant geographic market is smaller than the zip code.

However, given the way the broadband companies price their services, this inference is incorrect. Cable companies usually offer cable modem service for the same price and speeds across the service territory. Phone companies usually offer DSL at the same price and speeds across their entire service territory. Satellite broadband providers offer uniform national pricing plans at various speeds. For this reason, broadband companies with a significant degree of overlap are likely to constrain each others' prices, even if every consumer in each one's service area cannot receive service from every provider.[40] Therefore, the FCC's zip code based data may well present a fairly accurate picture of the state of competition in relevant geographic markets—at least in urban and suburban areas. Indeed, the relevant geographic market may well be much larger than the zip code in these areas. Rural areas where a zip code covers a large geographic area may require a different treatment if multiple broadband providers typically serve completely non-overlapping areas within zip codes.

Market power and concentration: If firms lack significant market power, then it is unlikely that restrictive vertical arrangements, discriminatory treatment of packets, or price discrimination harm consumers. Monopoly, duopoly, and oligopoly all end in the suffix "-poly," but the suffix does not imply any automatic relationship between market structure and consumer welfare. Oligopoly theory unequivocally shows that when the number of competitors ranges between two and a small number, anything can happen, depending on the circumstances.

[40] In the past, cable television companies may have engaged in targeted predatory pricing, or at least significant price discrimination, when local franchising authorities forced potential entrants to disclose which areas the entrants intended to serve first. *See* Thomas W. Hazlett, *Predation in Local Cable TV Markets*, 40 ANTITRUST BULL. 609, 616-17 (1995). Since local franchising authorities do not have regulatory authority over broadband, this possibility is much less likely for broadband.

Recent studies on the relationship between concentration and prices have produced a wide variety of results that depend on the facts and circumstances in the industry studied. Some empirical research on railroads, for example, finds that two competitors are sufficient to produce the results one would expect in a competitive market.[41] Across a variety of industries, a number of studies find a positive relationship between concentration and prices, but not all do.[42] Laboratory experiments find that four sellers are usually enough to produce a competitive market outcome.[43] In general, the results seem to vary across industries and with the type of information buyers and sellers have.

The Department of Justice/Federal Trade Commission Merger Guidelines reflect the fact that there is no simple or mechanical relationship between the number of competitors and the competitiveness of the market. The guidelines indicate that mergers in more concentrated markets face a heightened level of review, but such mergers can still be legal.[44] The antitrust agencies try to take into account all relevant facts and circumstances in determining whether a merger would reduce competition and harm consumers.

A possible danger of oligopoly is that the firms might collude on prices or other terms of service. Thus far, experience with duopoly in cable TV, broadband, and telephone service suggests that even just two competitors often compete vigorously. Two decades of economic research find that the presence of a second wireline video competitor reduces rates by 15 percent or more. Competition from satellite and a second cable provider also prompted cable firms to increase the number of channels, upgrade plants to provide digital service, and otherwise improve the quality of service. A Government Accountability Office case study found that markets in which new broadband service providers compete with the existing cable and phone companies tend to have rates for video, Internet, and telephone service that are often lower than similar markets without such competition.[45]

The idea that two broadband firms would compete vigorously makes some sense because the costs of these networks are largely fixed. The firms face strong pressures to cut prices, increase channel capacity, or offer other inducements to acquire or retain customers.

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[41] Paul A. Pautler, *Evidence on Mergers and Acquisitions*, 48 ANTITRUST BULL., 181-82 (2003), and references cited therein.

[42] *Id.* at 189-95.

[43] *Id*. at 200-01.

[44] See Section 1.5, Concentration and Market Shares. A copy of the guidelines is available at http://www.usdoj.gov/atr/public/guidelines/horiz_book/toc.html.

[45] Cable franchising issues are examined in great detail in Jerry Brito and Jerry Ellig, *Video Killed the Franchise Star: The Consumer Cost of Cable Franchising and Proposed Policy Alternatives*, 5 J. ON TELECOMM. & HIGH TECH. L. 199 (2006) and Thomas W. Hazlett, *Cable TV Franchises as Barriers to Video Competition*, 11 VIRGINIA J. LAW & TECH. (2006), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=889406. For information on Broadband Service Providers, see Government Accountability Office, TELECOMMUNICATIONS: WIRE-BASED COMPETITION BENEFITED CONSUMERS IN SELECTED MARKETS (2004).

Multi-margin competition: Competition is not just about price, and in some cases price may be a much less important factor than various aspects of quality or performance. Performance, rather than price, might be the relevant attribute for identifying whether different service providers are in the same market or determining whether a firm has market power.[46]

Competitive businesses seek to continually improve performance—or even develop new aspects of performance that were not previously thought capable of improvement. For broadband, performance includes factors like:

- How fast is it?
- Do speeds slow if more users are on the system?
- How fast is the upload speed?
- How safe is my computer from intrusions by other network users?
- Can communications be intercepted?
- How effective are parental controls or other technologies customers might use to limit access?
- Does the presence of parental controls or filtering for other customers inhibit my ability to access what I want?
- Does the system have any features that protect copyrighted material?
- How good is the tech support, and what form does it take (phone, e-mail, Web, Internet chat, 24/7)?
- Is it wired or wireless?
- If wireless, can I receive the signal everywhere I want to use it, in all kinds of weather?
- What is the wireless range?
- Is the quality good enough to support voice?

In assessing market power, the FCC should consider whether price, performance, and/or some type of price/performance ratio best represents the most relevant margin(s) on which competition occurs.

Speed is perhaps the most measurable aspect of performance, and it illustrates the complexities of taking performance into account. The Appendix to this comment lists posted prices and maximum download speeds of various broadband services in 2005-06. Tremendous variation existed—from the 128 kbps offered by the slower wireless systems to the 30 mbps offered by some fiber and cable systems. Prices ranged from $10/month to $179/month. The price/performance ratio—price per kilobit of transmission speed—also varied greatly. Except for the relatively slow "entry level" DSL offerings, the phone companies' DSL cost one or two cents per kilobit. Cable modem cost the same or less, and fiber optic service costs tenths of a cent per kilobit. Most of the wireless services cost between five and 15 cents per kilobit. In many cases, different services look like they were close substitutes, depending on whether one considers price, speed, or the

[46] Christopher Pleatsikas and David Teece, *New Indicia for Antitrust Analysis in Markets Experiencing Rapid Innovation*, in Ellig (ed.), DYNAMIC COMPETITION AND PUBLIC POLICY 95-137 (2001).

price/speed ratio. This underscores the need to discover which services consumers treat as substitutes.

Contestability. Several stakeholders in the net neutrality debate have asserted that broadband access markets are "contestable."[47] They appear to mean that the market is open to anyone who is willing to make the necessary investments.

In economic theory, a contestable market is one in which there are no "sunk costs." A sunk cost is an up-front investment that cannot be recovered if the firm decides to leave the market. In a contestable market, the mere threat of entry is sufficient to prevent monopolistic behavior; actual entry need not occur.[48] Broadband access markets are clearly not contestable, as this term is normally understood by antitrust and regulatory economists, because entrants must make substantial investments that they may not be able to recover. The mere possibility of entry, therefore, is unlikely to control market power fully. Instead, such control would have to occur as a result of actual entry, a credible investment-backed commitment to enter, or the possibility of entry by a competitor possessing some advantage over the incumbents.

Dynamic competition and entry. Broadband is still a relatively new service subject to significant innovation. This implies that economic analysis of this industry needs to consider dynamic competition. The most prominent dynamic concept of competition is associated with economist Joseph Schumpeter. Schumpeter suggested that "competition from the new commodity, the new technology, the new source of supply, the new type of organization—competition which commands a decisive cost or quality advantage and which strikes not at the margins of the profits and the output of existing firms, but at their foundations and their very lives" triggers the most significant advances in human wellbeing.[49] In addition to Schumpeter, a variety of other scholars have also developed dynamic theories of competition.[50] In "evolutionary" competition theories, different firms have different abilities, novelty constantly arises, innovation occurs as firms learn, and there are limits to the amount of information decision makers can acquire and process. Competition is an open-ended process of innovation, experimentation, and feedback.[51] The purpose of competition is to reveal what services, costs, and prices are possible. The firms that survive and grow are those that do a better job than others of anticipating what

[47] See FTC workshop presentations by Walter B. McCormick, Jr., Feb. 13, and presentation of Joseph W. Waz, Jr., Feb. 14, available at http://www.ftc.gov/opp/workshops/broadband/index.shtml.

[48] See William J. Baumol et. al., CONTESTABLE MARKETS AND THE THEORY OF INDUSTRY STRUCTURE (1982).

[49] Joseph A. Schumpeter, CAPITALISM, SOCIALISM AND DEMOCRACY 84 (New York: Harper & Row, 1942).

[50] For an extensive summary of dynamic competition theories and references, see Jerry Ellig and Daniel Lin, *A Taxonomy of Dynamic Competition Theories*, in Jerry Ellig (Ed.), DYNAMIC COMPETITION AND PUBLIC POLICY 16-44 (New York: Cambridge University Press, 2001).

[51] Richard R. Nelson, *The Tension Between Process Stories and Equilibrium Models: Analyzing the Productivity-Growth Slowdown of the 1970s*, in Richard N. Langlois, ed., ECONOMICS AS A PROCESS: ESSAYS IN THE NEW INSTITUTIONAL ECONOMICS (Cambridge: Cambridge University Press, 1986).

consumers want and finding the best way to produce it. [52] Finally, strategic management scholars explicitly view competition as a continual striving to cost-effectively develop superior capabilities to serve consumers.[53] In a dynamically competitive market, some of the most important capabilities are the ability to innovate, to change business strategy rapidly, to drop and add services in response to customer needs, to upgrade products with new technology and features, and to change prices as market conditions change**.**

Dynamic competition has the potential to reduce the significance of sunk costs as a barrier to entry. The economic theory that identifies sunk costs as entry barriers assumes that incumbents and potential entrants all have access to the same technology so that all can produce at the same total cost. In dynamically competitive markets with heterogeneous firms, innovation allows new entrants to overcome some of the incumbent's sunk cost advantage. If a new entrant can provide service comparable to the incumbent's at a lower total cost, or if the entrant can offer new performance features that are valuable to consumers, then entry can occur even in the presence of sunk costs.

Some evidence indicates that dynamic competition may have reduced the significance of sunk costs as a barrier to entry in broadband. In many cases, the first firms to offer high-speed lines were cable companies selling cable modem service. They initially acquired a very high market share, but this market share corresponded to a tiny penetration rate as not many people subscribed. Cable modem's 60 percent market share at the end of 2004 corresponded to a penetration rate of only about 18 percent.[54]

Phone companies offering DSL service were usually the second or third market entrants, and they gradually built a respectable market share. Phone companies had much lower broadband market shares than the cable companies enjoyed in the early years. In 2005, new DSL subscriptions (5.7 million) exceeded new cable modem subscriptions (4.2 million) for the first time.[55] This trend continued for the first half of 2006, which saw 3.1 million additional DSL lines compared to two million additional cable modems.[56] This

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[52] Friedrich Hayek, *Competition as a Discovery Procedure*, in Hayek, NEW STUDIES IN PHILOSOPHY, POLITICS, AND ECONOMICS 179-90 (Chicago: University of Chicago Press, 1978); Israel Kirzner, *The Perils of Regulation: A Market Process Approach*, in DISCOVERY AND THE CAPITALIST PROCESS 119-49 (Chicago: University of Chicago Press, 1985); Kirzner, COMPETITION AND ENTREPRENEURSHIP (Chicago: University of Chicago Press, 1973).

[53] Jay Barney, *Competence Explanations of Economic Profits in Strategic Management: Some Policy Implications*, in Ellig, (Ed.), DYNAMIC COMPETITION AND PUBLIC POLICY 45-64 (2001).

[54] Michael J. Balhoff and Robert C. Rowe, MUNICIPAL BROADBAND: DIGGING BENEATH THE SURFACE (2005), at 22. Since the first quarter of 2003, the percentage of households using DSL more than doubled, from 6 percent to 13.8 percent. The percentage using cable modem increased from 10.5 percent to 18.3 percent.

[55] Federal Communications Commission, Wireline Competition Bureau, Industry Analysis and Technology Division, HIGH-SPEED SERVICES FOR INTERNET ACCESS: STATUS AS OF DECEMBER 31, 2005 (July 2006), at 2, available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-266596A1.pdf.

[56] Federal Communications Commission, Wireline Competition Bureau, Industry Analysis and Technology Division, HIGH-SPEED SERVICES FOR INTERNET ACCESS: STATUS AS OF JUNE 30, 2006 (January 2007), at 2.

was likely due to the substantial price reductions offered on DSL. DSL had a market share of 35 percent at midyear 2006.[57]

Wireless enjoyed substantial growth in 2005 and the first half of 2006. The number of mobile wireless subscribers rose from 380,000 in June 2005 to 3.1 million by December 2005 and then to 11 million in June 2006.[58] The FCC did not report mobile wireless subscribership in previous years, but by way of comparison, total subscribers to all wireless and satellite numbered 550,000 in 2004. Mobile wireless had a market share of 6.2 percent at the end of 2005 and 17 percent at midyear 2006.[59] This is the principal reason cable modem's share fell to 44.1 percent. Wireless firms that plan to expand their broadband offerings after acquiring additional spectrum in the Advanced Wireless Service auction may be the next major players to offer a significant cost or quality improvement.

Entry prohibitions by government, on the other hand, can still deter entry by a firm that has a cost or quality advantage over the incumbent. DSL often sells at a lower price than cable modem, but the cable companies enjoyed a substantial lead over the phone companies due to uncertainty over the regulatory status of DSL service.[60] Since there are several significant government-erected entry barriers—most notably cable franchising and federal spectrum allocation for wireless services—it is not clear that dynamic competition has had as strong an effect on entry as it could have in the absence of these other barriers.

Dynamic competition and rivalry: When dynamic competition is possible, firms have additional reasons to engage in rivalry rather than collusion. In dynamic competition, the firm that first introduces a cost-reducing or quality-enhancing technology, feature, or service can temporarily earn higher profits, until its success is imitated. Broadband exhibits significant progress in price and speed, suggesting that dynamic competition is strong and collusion is weak.

Substantial price reductions have occurred in recent years. Between 2004 and 2005, Bellsouth cut the monthly price of 1.5 mb DSL from $39.95 to $32.95, a 17 percent drop. Qwest dropped its promotional price from $26.99 to $19.99 and extended the term from three months to a year. SBC cut its promotional price, good for a year, from $26.95 to $14.95.[61] Verizon Wireless reduced the monthly fee for wireless broadband service using a PC card by 25 percent, from $79.99 to $59.99.[62]

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[57] Calculated from data *Id.*, Table 1.

[58] *Id*., Table 1.

[59] Calculated from figures *Id.*

[60] Thomas W. Hazlett et al., U.S. CHAMBER OF COMM., SENDING THE RIGHT SIGNALS: PROMOTING COMPETITION THROUGH TELECOMMUNICATIONS REFORM (2004) at 94-99, available at

http://www.uschamber.com/NR/rdonlyres/et3cydgjplrxcg7goxb5tlflazo2tw5hghhyplt7cu6wooge3bcnpqzx4bjeqb7ws5xqmgohikgclahnl77gydqmnvb/0410_telecommstudy.pdf.

[61]Balhoff and Rowe, ***supra*** note 54, at 23.

[62]http://www.verizonwireless.com/b2c/mobileoptions/broadband/index.jsp?action=broadbandAccess.

Another indicator of dynamic performance competition in broadband is the rate at which maximum speeds have increased. In its first report on the extent of broadband deployment, issued in 1999, the FCC noted that the maximum speeds were 3 mbps for cable modem service, 1.5 mbps for DSL, and under 500 kbps for satellite.[63] Speeds have obviously improved greatly since then. Between 2004 and 2005, a number of major broadband providers increased the speed of their service. SBC increased the upload speed of its DSL service threefold, from 128k to 384k. Cablevision increased its download speed from 5 mb to as much as 10 mb. Comcast increased its download speed from 3 mb to 4 mb and its upload speed from 256k to 384k. Time Warner increased download speed from 3 mb to as much as 8 mb.[64] These changes represent performance improvements of between 25 percent and 200 percent—in one year. In 2006, company web pages indicated further improvement in maximum speeds. Comcast offered a maximum download speed of 6 mb, Cox offered 15 mb, and Cablevision offered 30 mb.[65]

Dynamic competition and profits: Successful competitors appear to earn "rents," payments that exceed the opportunity cost of the resources the firm uses.[66] The prospect of earning these rents, however, is the prize that motivates firms to strive for superior performance. Profits that appear to be "mere rents" after the competitive process has revealed which competitors are successful may actually be a risk premium or a return to the firm's investment in unique capabilities. Restrictive or discriminatory business practices may be the most effective means of generating these rents. As a result, business practices, which at first glance appear "merely" to transfer wealth from consumers to broadband firms, may actually be the means by which the firm collects its reward for successful innovation. Dynamic competition theory suggests that such practices should be given the benefit of the doubt if they do not demonstrably reduce economic efficiency.

b. Terminating access monopoly

The possibility of "terminating access monopoly" raises issues distinct from the vertical issues discussed above. As long as each customer subscribes to only one Internet access provider, at any given time the access provider has a monopoly over access to its customers even if the market for Internet access is competitive. If the Internet access provider can charge other parties (such as content or applications providers) when they send data packets to its customers, it may be able to collect monopoly profits. The concept of terminating access monopoly was originally developed to analyze the incentives faced by local exchange carriers. However, the FCC should take care to ensure that any analogies between phone service and broadband account for critical differences between these services and the pre-existing regulatory environment.

[63] FCC, BROADBAND REPORT 1999, CC Docket No. 98-146 (January 28, 1999).

[64] Balhoff and Rowe, supra note 54, at 23.

[65] See Appendix for statistics and data sources.

[66] Harold Demsetz, *Industry Structure, Market Rivalry, and Public Policy,* 16 J. LAW & ECON. 1 (1973).

i. The problem defined

At any point, the local phone company that provides the individual subscriber with access to the rest of the telephone network has a monopoly over access to that individual. An unregulated company could exploit this position by charging all other carriers high rates to terminate calls to its customers. Competition may not curb this practice because the callers ultimately paying the termination charges are not customers of the network that is imposing the charges.[67] A customer who initiates a long-distance call, for example, is the customer of the long-distance company, which pays an access charge to the call recipient's local phone company. The recipient does not see this access charge, and so the recipient has little incentive to select a local phone company that imposes low access charges.

Economic theory suggests several ways in which terminating access monopoly can ultimately harm consumers. First, an established incumbent firm facing an entrant that initially serves only a small portion of the market can find it profitable to charge a very high access price that effectively curbs the entrant's ability to compete, thus cornering the market.[68] Second, access charges can facilitate collusion on retail prices when networks charge customers per call or by another unit of usage.[69] Third, access charges could end up increasing the price of a service whose demand is very price-sensitive, while reducing the price of a service whose demand is not very sensitive to price. This reduces overall consumer welfare, because the cost to consumers who cut back on the purchase of the price-sensitive services is much larger than the gains to consumers who buy more of the service whose demand is not sensitive to price. Historically, access charges on long-distance phone service have had precisely this effect.[70]

One solution to this problem advocated by many telecommunications economists and the FCC staff[71] is mandatory interconnection at a zero price, also known as "bill and keep." Phone companies would have to interconnect, but they could not impose access charges on each other or on each others' customers; each company's revenues would come solely from its own customers.[72]

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[67] Jerry Ellig, *Intercarrier Compensation and Consumer Welfare*, 2005 U. ILL. J.L. TECH & POL'Y 97 (2006), available at http://www.mercatus.org/repository/docLib/MC_RSP_RPTJIntercarrierComp_060303.pdf.

[68] Jean-Jacques Laffont, Patrick Rey, & Jean Tirole, *Network Competition: I. Overview and Nondiscriminatory Pricing*, 29 RAND J. ECON. 1, 19–20 (1998).

[69] Jean-Jacques Laffont, Patrick Rey, & Jean Tirole, *Competition Between Telecommunications Operators*, 41 EUR. ECON. REV. 701, 704–05 (1997).

[70] *See* Jerry Ellig, *Costs and Consequences of Federal Telecommunications Regulation*, 58 FED. COMM. L.J. 37, 52-56 (2006), and references cited therein, available at http://www.mercatus.org/repository/docLib/MC_RSP_RPTJTelecomCostsandConseq_060307.pdf.

[71] See Federal Communications Commission, *Developing a Unified Intercarrier Compensation Regime, Further Notice of Proposed Rulemaking*, 20 F.C.C.R. 4685 (2005), Appendix C [hereinafter Unified Intercarrier Compensation].

[72] An author of this comment has in fact advocated "bill and keep" as the appropriate policy to govern interconnection of telephone networks. For a more extensive analysis, see Ellig, *supra* note 67.

ii. Is Internet access analogous to telecommunications?

If broadband Internet access providers can charge content or applications providers when customers download their content or applications, they might seem similar to local phone companies that impose access charges. If consumers see only the price of Internet access—not the charges imposed on the content or applications providers—they may have little incentive to shop for an access provider who charges content or applications providers the most competitive rates. Instead, the costs of these access charges are spread among all the customers of the content or applications providers. If the Internet access provider happens to sell some similar content or applications, it may even find itself in a position to raise its rivals' costs by charging them for access to its customers. Mandatory interconnection, coupled with a "bill and keep" policy that prevents Internet access providers from charging anyone other than their own customers, could curb the terminating access monopoly. This looks a lot like many of the net neutrality proposals.

Despite seeming similarities, the analogy is inapposite. Broadband Internet contrasts markedly with the economic environment and institutional structure in telecommunications. In telecommunications, "bill and keep" would remedy a problem created by the historical legacy of pre-existing price regulation and incumbent local phone companies' "provider of last resort" obligations. Basic local telephone service is still subject to regulation that holds prices below some measure of long-run incremental cost for many customers.[73] Competitive local carriers must also hold their prices for local service artificially low, because they are competing with incumbents who are required by regulation to sell basic local phone service at prices that are often below cost. Usage-based access charges from long-distance service, which exceed the costs of switching, help cover the costs of the local network that local rates do not cover.[74] Since demand for local phone service is not very sensitive to price, but demand for long-distance minutes is, bill-and-keep pushes the regulated price structure in the direction that maximizes consumer welfare.

Bill-and-keep counteracts additional perverse incentives created by law and regulation that are unique to telecommunications. Laws and regulations that prevent itemized pass-through of termination charges inhibit market-based solutions to terminating access monopoly. The situation facing long-distance carriers illustrates the general problem. Federal law and regulation require that interexchange carriers offer rural customers the same rates as urban customers and charge the same rates in all states.[75] These

[73] Robert W. Crandall & Leonard Waverman, WHO PAYS FOR UNIVERSAL SERVICE?: WHEN TELEPHONE SUBSIDIES BECOME TRANSPARENT (2000), at 109-127; Robert W. Crandall & Jerry Ellig, Tex. Pub. Policy Found., TEXAS TELECOMMUNICATIONS: EVERYTHING'S DYNAMIC EXCEPT THE PRICING (2005), at 38, available at http://www.texaspolicy.com/pdf/2005-01-telecom.pdf.

[74] See, e.g., Billy Jack Gregg, *A Survey of Unbundled Network Element Prices in the United States*, THE NAT'L REG. RES. INST. tbl. 2 (July 2003) (showing in column G of Table 2A that cost-based unbundled network element switching rates are usually in tenths of a cent per minute).

[75] See Unified Intercarrier Compensation ¶ 83.

requirements force long-distance carriers to average access charges over all customers. Thus, the access charge regime concentrates benefits on local phone companies that collect high access charges while dispersing costs among all long-distance customers.

In the absence of such requirements, the long-distance companies could flow excessive terminating access charges to the customer who receives each call. Competition between local phone companies would help keep terminating access charges low for that segment of customers who desire low terminating access charges. When laws and regulations prevent consumers from seeing the full price associated with their choice of local telephone company by averaging access charges across all of the long-distance company's customers, it should be no surprise that excessive access charges emerge.

No similar regulations exist in the market for Internet service. If an Internet access provider imposes a fee on content or applications providers, the content or applications providers can choose to pass this cost directly to the users of their services who subscribe to that particular Internet access provider. The consumer would see the full price charged by the Internet access provider and could respond accordingly. Competition in the Internet access market then becomes the key to preventing exploitation of the terminating access monopoly.

iii. Is Internet access a "two-sided" market?

If Internet access providers could charge application or content providers to reach their customers, then the economics literature on "two-sided markets" may become relevant. Like net neutrality, the concept of a two-sided market has varying definitions. In general, a two-sided market is one in which an intermediary connects two different groups of customers, and the value of the service to each customer depends on how many and what type of customers are on the "other" side of the market. Dating services, newspapers, stock exchanges, computer operating systems, Internet search engines, and credit card networks are commonly-cited examples of two-sided markets.[76]

Evaluating market power in a two-sided market requires assessment of both sides of the market. If the Internet access market is competitive, for example, it is difficult to understand why any rents the access providers might earn from charges on content or applications providers would not be rebated to consumers in the form of lower prices for Internet access.[77] Evans and Noel outline the issue:

> Suppose that in a market without multihoming [i.e., each Internet user connects via only one access provider], there is limited competition on side A because customers cannot easily switch between vendors on that side, but there is intense competition on side B because customers can and

[76] David S. Evans and Michael Noel, *Defining Antitrust Markets When Firms Operate Two-Sided Platforms*, 2005 COL. BUS. L. REV. 667 (2005), at 674-84.

[77] See FTC workshop presentation by Marius Schwartz, Feb. 13, available at http://www.ftc.gov/opp/workshops/broadband/index.shtml.

> do switch between vendors based on price and quality. If competitors on side B cannot differentiate their products and otherwise compete on an equal footing, then the ability to raise prices on side A will not lead to an increase in profits. Any additional profits on side A will be wiped away by competition on side B.[78]

Competition in Internet access might not prevent access providers from charging content or applications providers from access to their customers. But it should help ensure that such charges will occur only when they improve consumer welfare. Charges imposed by Internet access providers on content or applications providers might improve consumer welfare, for several reasons.

The simplest is demand-sensitive pricing to cover fixed costs. In the presence of fixed costs that must be covered via a markup over marginal costs, the pricing structure that maximizes consumer welfare is one which imposes a higher markup over marginal cost on services whose demand is less sensitive to price.[79] This is also, in general, the more profitable pricing strategy for the firm. In two-sided markets, a similar type of pricing arrangement occurs: "[T]he side with less elastic demand will typically face the higher price, because raising the price for those with more elastic demand will lead to more lost sales." In addition, the side of the market that pays the lower price tends to be whichever side creates the most value for the other side when it uses more of the service.[80] Therefore, if customers who use Internet content or applications are more price-sensitive, and if an increase in subscription by this group tends to create a lot of value for content and applications providers, then an Internet access provider would likely want to reduce prices or offer other inducements that increase subscription if it gained the ability to charge applications or content providers.

Whether a higher price for some content or applications, coupled with a lower price for Internet access, would improve consumer welfare, is an empirical question. However, studies that estimate the elasticity of demand for broadband service are suggestive. Several studies find that the elasticity of demand for DSL broadband service exceeds -1; that is, a one percent change in price leads to a greater than one percent change in subscribership.[81] Most attempts to measure the overall elasticity of demand for broadband—not just DSL—have found that it is highly elastic, ranging from -1.5 to -

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[78] Evans and Noel, ***supra*** note 76, at 695.

[79] See Frank P. Ramsey, ***A Contribution to the Theory of Taxation,*** 37 ECON J. 47 (1927). .

[80] Timothy J. Muris, ***Payment Card Regulation and the (Mis)Application of the Economics of Two-Sided Markets,*** 2005 COL. BUS. L. REV. 515 (2005), at 519. The principal difference between Ramsey pricing and elasticity-sensitive pricing in two-sided markets is that, unlike Ramsey pricing, optimal pricing in two-sided markets may not be related to marginal cost. One side of the market may even receive a "subsidy" due to the value it creates for the other side.

[81] Robert W. Crandall, J. Gregory Sidak, and Hal J. Singer, ***The Empirical Case Against Asymmetric Regulation of Broadband Internet Access***, 17 BERKELEY TECHNOLOGY LAW JOURNAL (Summer 2002) at 973-74; Robert W. Crandall, Robert W. Hahn, and Timothy J. Tardiff, ***The Benefits of Broadband and the Effect of Regulation***, in Robert W. Crandall and James H. Alleman (eds.), BROADBAND (Washington, DC: The Brookings Institution, 2002) at 301 and references cited therein.

3.76.[82] If elasticities of demand for at least some content or applications are lower than this, then allowing Internet access providers to charge content or applications providers could increase consumer welfare simply by recovering more of the fixed costs from the less price-sensitive services.

There are additional opportunities to improve consumer welfare if some content or applications function better when their data packets receive a higher priority of service. Charging a premium for better service allows the Internet service provider to cover the costs associated with such service and allocate scarce capacity to uses that consumers value more highly. Consumers might have to pay higher prices for content or applications if the provider has to pay the Internet service provider a fee for priority service. Competition among content and applications providers helps ensure that the higher-priced service will survive only if the additional value to consumers exceeds the additional cost.

The two-sided markets literature may hold many other complex implications for the study of net neutrality.[83] But one familiar point is clear: if the Internet is a two-sided market, competition in the market for Internet access plays a key role in safeguarding overall consumer welfare.

3. Identify the uniquely federal role

"If this was easy, it wouldn't be so hard."

—Yogi Berra

The fact that a market failure or other systemic problem prevents the achievement of desired policy outcomes does not automatically mean that the federal government will provide the most effective remedy. Nevertheless, the interstate—indeed, international—nature of the Internet suggests there are strong reasons to believe that the federal government should play the major role. Indeed, when the Maryland legislature recently considered a broadband discrimination law, the state's attorney general's office issued an opinion that the proposed bill would likely be preempted by existing Commission rules and might also violate the Commerce Clause.[84] Regulation of discrimination in broadband networks is likely an exclusively federal role. In any event, court and FCC decisions have virtually guaranteed that the federal government will take the lead.[85]

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[82] Austan Goolsbee, *Subsidies, the Value of Broadband, and the Importance of Fixed Costs*, in Crandall and Alleman at 283-84.

[83] Especially enlightening in this regard is the 2005 symposium published in the COLUMBIA BUSINESS LAW REVIEW and the economic analyses cited therein.

[84] *See* Letter from Kathryn M. Rowe, Assistant Attorney General of Maryland, to Mary Ann Love, member of Maryland House of Delegates (Feb. 27, 2007), *available at* http://www.publicknowledge.org/pdf/md-ag-letter-20070227.pdf.

[85] See, e.g., *Vonage Holdings Corp. v. Minn. Pub. Utilities Comm'n*, 290 F. Supp. 2d 993, 995 (D. Minn. 2003).

4. Assess effectiveness of alternative approaches

"Steer, don't row."

—David Osborne and Ted Gaebler[86]

A finding that market failure justifies ***some*** federal role does not mean that ***any conceivable*** federal role will do. Government has a wide variety of options to influence outcomes in the broadband marketplace. These include direct provision of broadband service by government, various public-private partnerships, performance-based regulation, command-and-control regulation, information disclosure regulations, antitrust enforcement, removal of entry barriers, commercial law, tort law, and contract law. For any postulated outcome and market failure, the FCC should assess which alternative is likely to achieve the goal most effectively.

Suppose, for example, the FCC determines that broadband access providers have market power and discriminatory treatment of others' content or applications would allow them to exercise that power in ways that harm consumers. That identifies a problem, but there are several alternative solutions. The commission could adopt rules that explicitly prohibit certain practices. Alternatively, the FCC could specify outcomes it hopes to achieve, and network owners could remain free to engage in "non-neutral" behavior as long as they can demonstrate that it does not undermine those outcomes. The FTC could conduct enforcement under the FTC Act, where many practices alleged to violate net neutrality would be analyzed under the antitrust rule of reason. Another potential solution would be for government at all levels to vigorously promote new entry, thus eliminating opportunities for firms to engage in anticompetitive behavior.

New entry of facilities-based competitors is likely to be the most effective remedy for any market power that may exist, assuming such entry is timely. This is a direct implication of the well-established principle, often noted by antitrust officials and regulators alike, that "[C]ompetition generally produces the best results for consumers over time"[87] and "Competition—not regulation—best leads to better services and lower prices."[88]

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[86] The phrase, popularized by David Osborne and Ted Gaebler, precisely captures the idea that government's main role is to articulate outcomes and find the most effective way of accomplishing them, rather than treating any particular means as sacrosanct. See David Osborne and Ted Gaebler, REINVENTING GOVERNMENT: HOW THE ENTREPRENEURIAL SPIRIT IS TRANSFORMING THE PUBLIC SECTOR (Boston: Addison-Wesley, 1992).

[87] Deborah Majoris, *The Federal Trade Commission in the Online World: Promoting Competition and Protecting Consumers*, Luncheon Address, Progress & Freedom Foundation's Aspen Summit (Aug. 21, 1006), at 17, available at http://www.ftc.gov/speeches/majoras/060821pffaspenfinal.pdf.

[88] *Remarks of FCC Chairman Kevin Martin, Georgetown University McDonough School of Business's Center for Business and Public Policy* (Nov. 30, 2006), at 1, available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-268774A1.pdf.

There are two potential drawbacks associated with relying upon new entry as the primary solution:

> (1) Entry into broadband access takes large investments and significant time, so even if government-imposed barriers are removed, entry may not occur quickly enough to prevent anticompetitive discrimination.
>
> (2) Some significant forms of new entry, such as wireless, might not be close enough substitutes for DSL and cable to constrain anticompetitive behavior.[89]

Both of these arguments rest on hypotheses that may or may not be true. Before determining whether any new regulation is necessary, the FCC should assess the likely speed and effects of entry in the absence of government-imposed entry barriers. These could then be compared to the likely speed and effects of more aggressive government remedies to determine which alternative, or blend of alternatives, is most likely to promote consumer welfare or accomplish other desired policy outcomes.

Economic analysis is useful for assessing the effectiveness of proposed solutions even when the desired outcome is something other than consumer welfare, such as the public discourse values.

Consider, for example, the financial incentives of a profit-maximizing Internet access provider who considers blocking or degrading political speech over its network. If many individuals purchase Internet access because they want to engage in political speech, then Internet access providers have a strong financial incentive to avoid hampering political speech on the Internet. They get more customers and revenues if the customers are confident that they can use the Internet for political speech. Technology may give companies the ability to block or "censor" political speech, but they would pay a financial price for doing so. This does not mean that the profit motive will guarantee "net neutrality" for political speech, but it does suggest that Internet service providers would prevent their customers from sending or receiving political speech only in extraordinary circumstances. Identifying those circumstances would allow regulators to craft a more targeted remedy that would focus enforcement resources on the most significant problems likely to occur.

Economic analysis can also help identify how differential pricing options offered by Internet access providers might affect the degree of public participation in political speech via the Internet. Suppose, for example, an Internet service provider charges content or applications providers for access to its customers as part of a "Ramsey pricing" scheme, which recovers fixed costs with higher markups or prices on services whose demand is less sensitive to price.[90] The price of using some content or applications will

[89] FTC workshop presentation by Harold Feld, Feb. 14, available at http://www.ftc.gov/opp/workshops/broadband/presentations/feld.pdf.

[90] The name of the concept originated with Ramsey, ***supra*** note 79. Carlton and Frankel explicitly note the parallels between analysis of optimal taxation descended from Ramsey's theory and the pricing issues in "two-sided markets," where an intermediary serves two groups of customers and the value of the network

likely be higher than it would otherwise be, but the price of Internet access will likely be lower than it would otherwise be. As a result, more people would decide to get Internet access. Overall public participation in political speech on the Internet could increase, because more people would actually be using the Internet. Thus, non-neutral treatment of some traffic might actually improve public participation.

These examples are testable theories, based on fundamental economic principles, which imply that net neutrality might not be the most effective means of promoting important public discourse values. Net neutrality cannot be rejected based on these theories alone. But if public discourse values are important, net neutrality should not be accepted until decision makers actually know, based on coherent theory and evidence, whether it is the most effective means of promoting specific outcomes derived from these values. Economic analysis can help address the questions of cause and effect that must be answered in order to identify the most effective means.

5. Identify costs

"Everyone is entitled to his own opinion, but not his own facts."

—Sen. Daniel Patrick Moynihan

The accurate measure of the cost of any government action is its opportunity cost: what did we as a society give up in order to devote resources to taking the action? Government and private expenditures only partially measure the forgone benefits associated with a particular course of action. Sound regulatory analysis also identifies hidden and indirect costs that are less obvious than direct expenditures.

When federal agencies and private firms spend money to enforce and comply with regulations, the money has to come from somewhere. Government, of course, gets money from taxes. Businesses and other entities ultimately have to get the money by charging customers. In both cases, the costs of regulation ultimately affect the prices that consumers pay for the things they buy.

When prices or taxes increase due to regulation, consumers pay more. Some consumers may also pay higher prices than they otherwise would due to regulations intended to prevent "discriminatory" pricing. In addition to these direct costs are the indirect costs that arise when consumers respond to the price increases by purchasing less of the products or services whose prices have increased. The value that this lost output would have created for consumers and producers is called the "deadweight loss" or "excess burden" associated with the tax or regulation.

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to each group depends on how many of the other group are in the network: "Therefore, in a two-sided market, fee allocation among the various groups becomes an interesting problem similar to optimal taxation. This allocation issue is separate from (though related to) that of determining the total fee amount." See Dennis W. Carlton and Alan S. Frankel, ***Transaction Costs, Externalities, and "Two-Sided" Payment Markets***, 2005 COL. BUS. L. REV. 617 (2005) at 627.

Scholarly research finds that the deadweight loss associated with general taxation ranges from 25-40 cents per dollar raised.[91] An OMB "rule of thumb" assumes that the deadweight loss associated with federal taxation equals 25 percent of revenues.[92]

Deadweight losses are likely to be high when the additional costs of providing additional service are low, the value of the additional service to consumers exceeds these costs, and consumer purchasing decisions are sensitive to price. These are all likely characteristics of broadband. Most of the costs are fixed, the incremental cost of serving a few more consumers is likely low compared to the price they pay, and elasticities of demand are high.[93] For these reasons, the deadweight loss associated with cost-increasing or price-distorting regulation of broadband would probably be high.[94]

6. Compare costs with outcomes

"It's impossible to maximize both X and Y."

—Scott Wallstein

Cost information cannot be considered in isolation. A costly regulation may nevertheless create significant positive outcomes that are valuable to policymakers and citizens. Information on outcomes and costs can be combined in a variety of ways to aid decision making, such as analysis of cost-effectiveness or comparison of costs and benefits.

Comparing costs and benefits does not automate decisions, because different decision makers may ascribe different values to the benefits. Even when benefits can be expressed in monetary terms, the dollar amounts usually reflect the value of the benefits to the "average" or "typical" person. Cost-benefit analysis may mask significant diversity in the value that different people attach to the benefits. Two different decision makers, armed with the same information about cost effectiveness or the same cost-benefit comparisons, can still reasonably disagree about what to do based on their values.

Consumer welfare is an important value, but it need not be the only value of interest to decision makers. Responsible decisions, however, require a clear understanding of the terms of the tradeoffs. How much consumer welfare gets sacrificed to promote competitiveness or public discourse? How much public political participation gets sacrificed if consumer welfare becomes the overriding goal? Which regulatory policies

[91] Jerry Hausman, "Efficiency Effects on the US Economy from Wireless Taxation," 53 *National Tax Journal* 733 (September 2000).

[92] Office of Management and Budget, *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs*, Circular No. A-94 Revised, Transmittal Memo No. 64, October 29, 1992, http://www.whitehouse.gov/omb/circulars/a094/a094.html.

[93] See studies of demand elasticity cited on p. 22 *supra*.

[94] Economic research finds that deadweight losses associated with FCC regulation of price-sensitive telecommunications services are quite high compared with the deadweight loss associated with general taxation. See the analysis of regulations that apply to long-distance and wireless in Ellig, *supra* note 70, at Tbl. 2.

accomplish desired objectives at the least sacrifice of other values? Decision makers need to know when reality requires these tradeoffs and whether they are large or small. Accountability in government requires that citizens have a transparent accounting of the tradeoffs. Regulatory analysis provides the tools necessary to provide that accounting.

IV. Conclusion

The FCC has no authority to enforce the Internet Policy Statement as it currently exists. The Policy Statement was not subject to notice-and-comment rulemaking, was not published in the ***Federal Register***, and was issued separately from the DSL Order, in which the Commission explicitly said there was not enough information on the record to justify issuing rules on consumer access to broadband. At best, the Policy Statement is a warning that the Commission might undertake a rulemaking if evidence of abuses comes to its attention. Nevertheless, to make the Policy Statement enforceable, the Commission would first need to initiate a notice-and-comment rulemaking.

The current inquiry may or may not be prelude to a rulemaking. In either case, the Commission would do well to employ a rational framework that identifies the values the Commission seeks to advance, establishes how alternative regulatory proposals would affect outcomes associated with those values, and clarifies any tradeoffs among competing values. The regulatory analysis framework already employed by most federal agencies would accomplish these goals. In keeping with this framework, the FCC should:

- define specific outcomes that net neutrality regulation is supposed to produce,
- assess evidence of market failures or other systemic problems,
- identify the uniquely federal role,
- compare the effectiveness of alternative approaches,
- examine the costs of alternative regulatory approaches, and
- compare costs with outcomes.

If done well, such an analysis should provide the Commission with ample background to determine whether or what further rulemaking is warranted.

Appendix: Broadband Prices and Speeds, 2005-06

Government Systems Location	Name	Monthly Fee	Download Speed (kilobits/sec.)	Price/ Kilobit
Wireless				
Cupertino, CA	MetroFi	$19.95	1000	$0.020
Rochelle, IL	Rochelle Muni. Utils.	$74.95	256	$0.293
		$94.95	512	$0.185
Richmond, IN	Richmond Pwr. & Lt.	$39.95	1000	$0.040
Scottsburg, IN	Scottsburg C3bb	$35.00	512	$0.068
		$70.00	1000	$0.070
Tell City, IN	Tell City Elec. Dept.	$29.95	384	$0.078
		$44.95	768	$0.059
		$84.95	1540	$0.055
Western Kansas	Wheatland Electric	$37.00	512	$0.072
		$87.00	1000	$0.087
Owensboro, KY	Owensboro Muni. Utils.	$29.99	512	$0.059
Vivian, LA, and	Fastline Internet	$10.00	64	$0.156
Linden, TX		$60.00	1000	$0.060
Alexandria, MN	Alex. Bd. of Pub. Wks.	$29.95	128	$0.234
		$39.95	512	$0.078
Buffalo, MN	Buffalo Muni. Util.	$9.99	192	$0.052
Chaska, MN	City-owned ISP	$16.00	1000	$0.016
Grand Haven, MI	Ottawa Wireless	$15.00	100	$0.150
		$45.00	512	$0.088
Carthage, MO	Ecarthage.com	$39.95	1000	$0.040
Marshall, MO	Marshall Muni. Utils.	$30.00	250	$0.120
		$70.00	500	$0.140
		$105.00	750	$0.140
Rio Rancho, NM	Azulstar	$20.00	256	$0.078
		$40.00	1500	$0.027
		$80.00	4000	$0.020
Floresville, TX	Floresville Elec. Lt. & Power	$49.95	128	$0.390
		$59.95	256	$0.234
		$69.95	384	$0.182
		$89.95	512	$0.176
		$105.95	768	$0.138
		$155.95	1024	$0.152
		$199.95	1536	$0.130
Benton County, WA	Maverick Wireless	$19.95	128	$0.156
		$34.95	512	$0.068
		$49.95	1000	$0.050
Southeast WA	Columbia Rural Electric	$40.00	256	$0.156
		$260.00	1500	$0.173
Sun Prairie, WI	Sun Prairie Wtr./Lt.	$35.00	768	$0.046

Government Systems Location	Name	Monthly Fee	Download Speed (kilobits/sec.)	Price/ Kilobit
Cable Modem				
Opp, AL	Opp Cablevision	$24.95	256	$0.097
		$34.95	512	$0.068
		$44.95	1024	$0.044
Scottsboro, AL	Scottsboro Elec Pwr Bd	$31.00	512	$0.061
		$43.00	1500	$0.029
		$58.00	3000	$0.019
Ketchikan, AK	Ketchikan Pub Util	$47.95	512	$0.094
		$59.95	1000	$0.060
		$99.95	1500	$0.067
Conway, AR	Conway Corp.	$39.95	2048	$0.020
		$59.95	3084	$0.019
Paragould, AR	Parag. Lt., Wtr. & Cable	$25.95	NA	
		$39.95	NA	
		$59.95	NA	
Alameda, CA	Alameda Pwr & Teleco	$29.99	1000	$0.030
		$49.99	3000	$0.017
		$52.99	4000	$0.013
Elberton, GA	City	$50.00	500	$0.100
Monroe, GA	Monroe Utilities	$39.95	6000	$0.007
Algona, IA	Algona Muni. Utils.	$49.95	1000	$0.050
		$69.95	1500	$0.047
Alta, IA	City of Alta	$44.95	256	$0.176
		$54.95	512	$0.107
Cedar Falls, IA	Cedar Falls Utilities	$24.95	168	$0.149
		$40.00	3920	$0.010
Harlan, IA	Harlan Muni. Utils.	$37.50	1540	$0.024
Laurens, IA	Laurens Muni. Comm.	$49.95	1000	$0.050
Muscatine, IA	Muscatine Power	$21.95	128	$0.171
		$39.00	1000	$0.039
		$59.95	3000	$0.020
Orange City, IA	Orange City Communic.	$39.95	3000	$0.013
Osage, IA	Osage Muni. Utils.	$45.95	256	$0.179
		$59.95	512	$0.117
		$79.95	768	$0.104
		$99.95	1000	$0.100
Spencer, IA	Spencer Muni. Utils.	$34.95	6000	$0.006
		$64.95	10000	$0.006

Government Systems Location	Name	Monthly Fee	Download Speed (kilobits/sec.)	Price/ Kilobit
Cable Modem (contd.)				
Sanborn, IA	The Community Agency	$26.95	128	$0.211
		$39.95	512	$0.078
		$69.95	1000	$0.070
Bardstown, KY	Bardstown Cable TV	$27.95	512	$0.055
		$32.95	1000	$0.033
		$42.95	3000	$0.014
		$52.95	6000	$0.009
Frankfort, KY	Frankfort Elec. & Water	$19.00	128	$0.148
		$23.00	256	$0.090
		$29.00	512	$0.057
Glasgow, KY	Glasgow Elec. Board	$25.95	1000	$0.026
Murray, KY	Murray Electric	$29.95	256	$0.117
		$40.95	500	$0.082
		$48.95	1000	$0.049
		$59.95	4000	$0.015
Easton, MD	Easton Utils. Comm.	$24.95	128	$0.195
		$39.95	5000	$0.008
Braintree, MA	Braintree Elec. Light	$39.00	5000	$0.008
Poplar Bluff, MO	City of Poplar Bluff	$29.95	256	$0.117
		$34.95	512	$0.068
Lebanon, OH	City/GO Concepts	$45.95	5000	$0.009
		$74.95	10000	$0.007
Wadsworth, OH	Elec. & Comm. Dept.	$22.45	128	$0.175
		$29.95	256	$0.117
Brookings, SD	Brookings Muni. Utils.	$34.95	512	$0.068
Columbia, TN	Columbia Pwr. & Water	$32.95	384	$0.086
		$41.95	640	$0.066
		$47.95	1500	$0.032
		$57.95	2000	$0.029
		$77.95	3000	$0.026
Fayetteville, TN	Fayetteville Electric	$44.95	256	$0.176
Greenville, TX	Greenville Elec. Util.	$37.95	6000	$0.006
Tacoma, WA	Click/Advanced Stream	$29.90	1000	$0.030
		$39.90	3000	$0.013
		$59.90	6000	$0.010

Government Systems Location	Name	Monthly Fee	Download Speed (kilobits/sec.)	Price/ Kilobit
Fiber				
Sylacauga, AL	Sylacauga Util. Board	$120.00	1000	$0.120
Ashland, OR	Ashland Fiber Network	$44.00	5000	$0.009
Bristol, VA	Bristol Virginia Utilities	$26.36	1000	$0.026
		$35.16	3000	$0.012
		$39.56	5000	$0.008
Sallisaw, OK	Sallisaw DiamondNet	$29.95	1000	$0.030
		$39.95	2000	$0.020
		$59.95	4000	$0.015
		$149.95	10000	$0.015
Kutztown, PA	Hometown Utilicom	$15.00	1000	$0.015
		$20.00	1000	$0.020
		$25.00	1000	$0.025
		$30.00	1000	$0.030
		$40.00	1000	$0.040
Reedsburg, WI	Reedsburg Util. Comm.	$24.95	128	$0.195
		$34.95	1000	$0.035
		$39.95	3000	$0.013
DSL/ISDN				
Gainesville, FL (ISDN)	GRUCom	$24.95	128	$0.195
Richmond, IN	Rich. Pwr. & Lt.	$39.95	3000	$0.013
Barnesville, MN	Barnesville Muni. Tel.	$41.90	128	$0.327
		$48.85	256	$0.191
		$57.85	384	$0.151
		$74.85	512	$0.146

Private Systems Location	Name	Monthly Fee	Download Speed (kilobits/sec.)	Price/ Kilobit
DSL				
Regional	Bellsouth	$24.95	256	$0.097
		$32.95	1500	$0.022
		$37.95	3000	$0.013
		$46.95	6000	$0.008
Regional	Qwest	$31.99	256	$0.125
		$24.99	1500	$0.017
		$34.99	5000	$0.007
Regional	SBC	$14.99	1500	$0.010
		$21.99	3000	$0.007
		$49.99	6000	$0.008
Regional	Verizon	$14.95	768	$0.019
		$29.95	3000	$0.010
Cable Modem				
Regional	Cablevision	$49.95	10000	$0.005
		$64.90	30000	$0.002
Alexandria, VA	Comcast	$57.95	4000	$0.014
		$67.95	6000	$0.011
Fairfax, VA	Cox	$54.95	5000	$0.011
		$69.95	15000	$0.005
Philadelphia, PA	Time Warner	$54.95	3000	$0.018
		$84.95	6000	$0.014
Washington, DC	RCN	$16.95	768	$0.022
		$52.95	5000	$0.011
		$77.95	10000	$0.008
Fiber				
Select cities	Verizon Fios	$34.95	5000	$0.007
		$44.95	15000	$0.003
		$179.95	30000	$0.006
Satellite				
National	Directway	$99.99	700	$0.143
		$109.99	1000	$0.110
Mobile Wireless				
Major cities	Verizon	$59.00	700	$0.084
National network	Verizon	$59.00	144	$0.410
	T-Mobile	$49.99	56	$0.893
EDGE	Cingular	$59.99	135	$0.444
GPRS	Cingular	$59.99	40	$1.500

Data source: Jerry Ellig, *A Dynamic Perspective on Government Broadband Initiatives*, Reason Foundation Policy Study No. 349 (Nov. 2006), available at http://www.reason.org/ps349.pdf.